EFFICACY OF EPLEY'S MANEUVER VERSUS BRANDT AND DAROFF EXERCISES IN BENIGN PAROXYSMAL POSITIONAL VERTIGO

A Dissertation Submitted In Partial Fulfillment

Of The Requirements For The Degree Of

MASTER OF PHYSIOTHERAPY

With Specialization In

ADVANCED PHYSIOTHERAPY IN NEUROLOGY

(Register Number: 27091412)

Submitted to

THE TAMILNADU Dr. M.G.R MEDICAL UNIVERSITY
Chennai

JKK MUNIRAJAH MEDICAL RESEARCH FOUNDATION

COLLEGE OF PHYSIOTHERAPY

Department of Post Graduate Studies
Komarapalayam - 638 183

APRIL - 2011

EFFICACY OF EPLEY'S MANEUVER VERSUS BRANDT AND DAROFF EXERCISES IN BENIGN PAROXYSMAL POSITIONAL VERTIGO

Internal Examiner:

External Examiner:

A Dissertation Submitted In Partial Fulfillment Of The Requirements For The Degree Of

MASTER OF PHYSIOTHERAPY

To

THE TAMILNADU Dr.M.G.R MEDICAL UNIVERSITY

Chennai.

APRIL - 2011

CERTIFICATE

This is to certify that the Research work entitled **"EFFICACY OF EPLEY'S MANEUVER VERSUS BRANDT AND DAROFF EXERCISES IN BENIGN PAROXYSMAL POSITIONAL VERTIGO"** was carried out at JKK Munirajah Medical Research Foundation College of Physiotherapy, Komarapalayam, affiliated to The Tamilnadu Dr.M.G.R Medical university, Chennai-32, towards partial fulfillment for the award of Degree of **"Master of Physiotherapy"** course with **"Advanced Physiotherapy in Neurology"** as specialization. This work was done under the my supervision and guidance .

Mr. D.KANNAN, M.P.T., (Neuro) MIAP,
Principal,
JKKMMRF College of Physiotherapy,
Komarapalayam.

CERTIFICATE

This is to certify that the Research work entitled **"EFFICACY OF EPLEY'S MANEUVER VERSUS BRANDT AND DAROFF EXERCISES IN BENIGN PAROXYSMAL POSITIONAL VERTIGO"** was carried out at JKK Munirajah Medical Research Foundation College of Physiotherapy, Komarapalayam, affiliated to The Tamilnadu Dr.M.G.R Medical university, Chennai-32, towards partial fulfillment for the award of Degree of **"Master of Physiotherapy"** course with **"Advanced Physiotherapy in Neurology"** as specialization. This work was done under my supervision and guidance.

Mr. D.KANNAN, M.P.T., (Neuro) MIAP,
Principal,
JKKMMRF College of Physiotherapy,
Komarapalayam**.**

ACKNOWLEDGEMENT

"IN VAIN WITHOUT GOD"

The investigator expresses her whole hearted gratitude to "**THE GOD ALMIGHTY"** who has given countless opportunities and Parents, Sister and Brother who laid the foundation for knowledge and wisdom.

The investigator extends sincere thanks to **Dr. J.K.K. MUNIRAJAHH, M.Tech., (Bolton),** Correspondent, JKKMMRF College of Physiotherapy for providing all necessary infrastructure for an excellent P.G. Programme.

The investigator expresses deep concern and gratitude to **Mr. D. KANNAN, M.P.T., MIAP**, Principal, JKKMMRF College of Physiotherapy for his valuable suggestion, guidance and support.

The investigator acknowledges with all gratitude and deep indebtedness for the guidance and encouragement provided by **Mr. D. KANNAN, M.P.T., MIAP**, Principal, JKKMMRF College of Physiotherapy.

The investigator expresses much gratitude to **Mr. A.AYYAPPAN, M.P.T. (Neuro), Mr. R. FERDINAND, M.P.T. (Ortho), Mr. R. JOHN VINOTH RAJ, M.P.T. (Neuro). Mr. A.SARAVANAN, M.P.T. (Cardio), Mrs. R. VISNUPRIYA, M.P.T. (Neuro)** and **Mrs. V.KOKILA, M.P.T. (Ortho)** for their valuable guidance.

The investigator also has much gratitude to **Mr. K. DHANAPAL, M.Sc.**, JKKMMRF College of Physiotherapy, statistician for his unrelenting devotion and determination for statistical excellence.

The investigator is also indebted to her friends for their support and criticism during the work of this dissertation.

The investigator extends her sincere thanks to subjects who took part in the study.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF GRAPHS

LIST OF FIGURES

INTRODUCTION

Balance is a complex process involving the reception and organization of sensory input and the planning and execution of movement to achieve a goal required upright posture. It is controlled by both peripheral and central balance mechanism.

The peripheral component consists of visual system, vestibular system and somato sensory system in which vestibular system is most specialized and complex. The vestibular system provides the CNS information about the position and motion of head and direction of gravity.

The vestibular system consists of two types of motion sensor. First, the semi-circular canal which sense rotational faster movement of head and second, the otoliths, which sense slow linear, acceleration of head.

The function of vestibular system was affected by various diseases such as vestibular neuritis, Meniere's disease, perilymphatic fistula, Positional Vertigo and various bilateral vestibular disorders.

The Benign Paroxysmal Positional Vertigo is most common cause of peripheral vestibular disorder. It was first discovered by Barany in 1921. Later, defined by Dix and Hallpike in 1952. It is characterized by brief period of Vertigo that occurs when subject head moved into specific position usually affected ear down.

Frochliry et.al estimated that incidence is as higher as 107 cases per 1,00,000 population per year among adult population 42% reported

experience of dizziness or vertigo at same time. It have highly incidence in women. It is most commonly occur between 5^{th} and 7^{th} decade.

This condition presents as dizziness or Vertigo of sudden an set in Benign Paroxysmal Positional Vertigo and also include light headedness, imbalance, and nausea during Various activities. The symptoms will vary among persons. These symptoms are always precipitated by a change of position of the head with respect to gravity. Example getting out of bed or rolling over in bed are common problem and bending over and looking upwards present.

The disorders are assessed subjectively by visual analogue scale. Dizziness handicap inventory scale, functional disability scale, and motion sensitivity quotient and physically by head thrust test, head shaking including nystagmus and positional test. This study included dizziness handicap inventory scale, motion sensitivity quotient as a parameter.

Many physical therapy treatment techniques are used for treatment of Benign Paroxysmal Positional Vertigo they are Epley's Maneuver, Semonts Maneuver, Brandt-Daroff Habituation Exercise and non-specific Vestibular habitation exercise and others.

This study employed two treatment protocols of Epley's Maneuver and Brandt – Daroff exercises to determine its efficacy of Bengin Paroxysmal Positional Vertigo.

AIM OF STUDY

To compare the effect of Epley's Maneuver and Brandt and Daraff exercises is Benign Positional Vertigo.

OBJECTIVES OF THE STUDY:

To determine the effect of Epley's maneuver in Benign Paroxysmal Positional Vertigo with Dizziness Handicap Inventory and Motion sensitivity quotient.

To determine the effect of Brandt and Daraff Exercise in Benign Paroxysmal Positional vertigo with Dizziness Handicap Inventory and Motion Sensitivity Quotient.

To determine the deference between the Epley's Maneuver Versus Brandt and Daraff Exercise in Benign Paroxysmal Positional Vertigo with Dizziness Handicap Inventory and Motion Sensitivity Quotient.

HYPOTHESIS

The null hypothesis states that there was no significant difference between the Epley's Maneuver Versus Brandt and Daroff Exercises in Benign Paroxysmal Positional Vertigo.

ALTERNATE HYPOTHESIS

The alternate hypothesis states that there was significant difference between the Epley's Maneuver Versus Brandt and Daroff Exercise is Benign-Paroxysmal Positional Vertigo.

REVIEW OF LITERATURE

1. ARANDO MORENO C., et.al, (2000)

Conducted an experimental study an Benign Paroxysmal Positional vertigo with 100 patients to find out the effectiveness of Epley's maneuver and Semont maneuver. The selected patients were divided into two groups. The 1st group received semont maneuver and 2nd group received Epley's maneuver. They were assessed by motion sensitivity quotient. The result of the study showed that both group had significant improvement and equal reduction in score of motion Sensitivity Quotient.

2. BANFIELD GK, WOOD., et.al., (2000)

Conducted an experimental study on Benign paroxysmal positional Vertigo with patients to compare the efficacy of Epley's Maneuver and Vestibular habituation exercise. The selected patients were divided into 2 groups. The 1st group received Epley's Maneuver, 2nd group received habituation Exercise. The result of the study showed that the 1st group which received Epley's Maneuver had significant improvement than 2nd group.

3. BERNARDO CORTC MJ.,

To determine the effectives of particle repositioning maneuver for the treatment of Benign-paroxysmal Positional Vertigo. 37 patients with Benign – Paroxysmal Positional Vertigo received a single treatment of

Particle repositioning Maneuver. After a single treatment of particle Repositioning maneuver, there was complete remission of vertigo.

The result of the study showed that 97% of patients improved and particle reposition Epleys Maneuver is safe and effective in the treatment of Benign Paroxysmal Positional Vertigo.

4. COHEN HS, KIMBALL KT., et.al., (2000)

Conducted an experimental study on Benign Paroxysmal Positional vertigo with 15 individuals. These 15 patients with motion provoked dizziness and 10 control individuals were tested during sessions occurring 90min and / or 24 hrs after base line testing. The motion sensitivity quotient was found to be reliable across rates and test session. The validity was good. The result indicated that the motion sensitivity quotient can be used reliably in clinical practice to develop exercise programs for patients with motion – provoked dizziness and to provide evidence of intervention efficacy.

5. D'ONOFRIO F. et.al., (1998)

Conducted an experimental study on Benign Paroxysmal Positional Vertigo with 70 patients to find efficacy of Epley's and semonts maneuver. The selected patients are divided into two groups . the 1st group consists of 47 patients – they received Epley's maneuver and 2nd group consists of 23 – patients received Semonts maneuver. The patients are assessed by Dix-hallpike test.

The result of the study showed that two techniques proved equally effective in. Epleys maneuver (87.5%) and Semont Maneuver (82.^%) . But Epleys maneuver provided other advantage, it resolved the problem immediately – single session in 81% of cases, where semonts only 68.5%.

6. DOUGLAS. E.MD. et.al (1999)

Conducted an experimental study to determine the effects of Epley's maneuver on Benign Paroxysmal Positional Vertigo. He conducted the study on 107 patients, and the patients were assessed by Dix-hallpike test. The result of the study after a maximum of 5 sessions at weekly intervals showed that almost all patients had significant improvement.

7. HILTON.M, PINDER.D., et.al., (2002)

Conducted study an Benagn paroxysmal Positional Vertigo with 20 patients, to find out the efficacy of Epley's Maneuver. All patients underwent Epley's maneuver were more likely to have complete resolution of their symptoms and more likely to convert from a positive to negative Dix-hallpike test. There were no sessions adverse effects of treatment. There is some evidence that the Epley Maneuver is a safe effective treatment for Benign Paroxysmal Positional Vertigo.

8. LOPEZ-ESCASES., et.al (2001)

Conducted an experimental study on benign Paroxysmal Positional Vertigo with 39-patients, to find out the effectiveness of two-subjective assessment methods. Motion sensitivity quotient and Dizziness handicap

inventory shorts forms. The selected patients were treated with Epley's maneuver. The result of the study showed that both subjective assessment tools were effective in measuring the prognosis of benign paroxysmal Positional Vertigo after treatment.

9. MAYO CLIN PROC. Et.al., (2000)

Conducted an experimental study on Benign Paroxysmal Positional Vertigo with 50 Patients. The patients were divided in two-groups. The 1st group of 24 patients, received canalith re-positioning procedure and the 2nd group of 26 patients with Sham Maneuver.

The Mean Duration of follow-up was 10 days for both groups.

The result of the study showed that Dix-Hallpike Maneuver were negative for positional nystagmus and Vertigo in Group A patients (67%) and than Group B Patients (38%).

10. RICHARD. (2005)

To assess the efficacy of the Epley Maneuver in a study of 81 patients with Benign Paroxysmal Positional Vertigo. A Group of 61 patients underwent the Epley's maneuver, while a control group of 20 patients received no therapy. They were assessed by Dix-Hallpike test. The result of the study showed that the cure rate with Epley's maneuver was significantly higher (92.5%) than those with no therapy (37.5%).

11. SOTO-VAERLA.A. et.al (2001)

Conducted and experimental study on Benign Paroxymal Positional Vertigo with 106 patients. To evaluate the efficacy of 3-physical treatment, the brandt Daraff Habituation Exercise, Semont Maneuver and Epley's Maneuver. The selected patients were divided in to 3 groups. 1st group – received Brandt-daraff Exercises, 2nd group received – Epley's Maneuver, 3-Semonts Maneuver for 2 month duration.

This result of study showed that the cure rate obtained with brandt-daraff Maneuver (62%) and Semont Maneuver was 90% and Epley's Maneuver was 93%.

12. YIMTAE.K. et.al (2003)

Conducted an experimental study an BPPV of 58 patients. Aim of the study was to find out effectiveness of Epley's maneuver. The selected patient were divided in to 2-groups namely, (Group A- Treatment group , Group B- Controlled Group.

Both group received Epley's maneuver. The outcome of the progression and measured by the daily – grading of symptoms.

The result of the study showed that marked improvement is treatment Group a (78%) than control Group B (32%).

MATERIALS AND METHDOLOGY

MATERIALS:

- ☞ Dizziness Handicap inventory
- ☞ Motion Sensitivity Quotient
- ☞ Couch
- ☞ Pillows
- ☞ Marking tools
- ☞ Stop Watch

METHODOLOGY:

Study Design:

Quasi-Experimental Study

Study Setting:

The study was conducted in JKK Sampoorani Ammal Trust hospital, Department of Physiotherapy, Komarapalayam, Tamilnadu, India.

Study Sampling

A total number of 30 subjects with benign Paroxysmal Positional Vertigo were selected by convenient sampling method with due consideration to inclusive and exclusive criteria and they were divided into two groups namely Group A and group B with 15 subjects in each group.

Study Duration.

Duration of Study : 1 month

Group A : Epley's Maneuver – 30 minutes/3day/week.

Group B : Brandt and Daroff – 30minutes/3days/week

Inclusion Ceiteria:

→ Age group – 45 – 60 years

→ Sex – male

→ Unilateral Posterior Semicircular Canal Involvement.

→ Functional to normal ROM to neck and back.

Exclusion Criteria:

→ History to prior ear surgery

→ Orthopedic disorder that impairs functional neck and trunk range of motion.

→ On vestibular suppressant medication.

→ Alcohol intoxication.

→ Meniere's disease.

→ Perilymphatic fistula

→ Vestibular neuritis

→ Bilateral Vestibular disorder

→ Central Vestibular Disorder

→ Head trauma

Parameters:

1. Motion sensitivity quotient:

The motion sensitivity quotient is a list of 16 tasks that the client is asked to perform.

Intensity scale from 0 to 5

0 – no

5 – severe

Duration

Score	Duration
0	0 – 4 sec
1	5 – 10 sec
2	11 – 30 sec
3	≥ 30 sec

$$\text{Motion sensitivity Quotient} = \frac{\text{Position X Score x 100}}{2048}$$

Intensity of dizziness will be stated by the patient and duration of dizziness will be measured with a stop watch .

2. Dizziness Handicap Inventory (DHI)

The dizziness Handicap Inventory is a set of questionnaire containing 25 questions which are sub grouped into functional (F), emotional (E0 and Physical (P) components to which patients resposed

Score:

No	-	0
Sometimes	-	2
Yes	-	4

Functional: _____
36

Emotional: _____
36

Physical: _____
36

Total Score: _____
100

Procedure:

The total 30 Benign Paroxysmal Positional Vertigo Patient, diagnosed by Dix-Hallpike test, of age group 45-60 years, who are suitable for Inclusion criteria were recruited by Purposive random sampling technique and informed consents were obtained from subjects individually. They were divided in to two groups. Group A and Group B with 15 subjects each. Epley Maneuver was given to Group A and Brandt-Daroff Exercise was given to Group B. the Epley Maneuver performed once a day, Brandt-Daroff Exercise were performed 2 times a day for four weeks.

Statistical Tool

Paired 't' test:-

Paired 't' test was used to compare the pre and post test values of Group A and Group B subjects with benign paroxysmal Positional vertigo.

Formula: Paired't' test:

$$s = \sqrt{\frac{\sum d^2 - \frac{(\sum d)^2}{n}}{n-1}}$$

$$t = \frac{\bar{d}\sqrt{n}}{s}$$

d = difference between pre test Vs post test values

$\bar{d}$ = mean difference

n = total number of subjects

s = standard deviation.

Unpaired 't' test:

The unpaired 't' test was used to compare the statistically significant difference between Group A and Group B.

Formula: Unpaired 't' test:

$$s = \sqrt{\frac{(n_1 - 1)s_1^{\,2} + (n_2 - 1)s_2^{\,2}}{n_1 + n_2 - 2}}$$

$$t = \frac{\left|\bar{x}_1 - \bar{x}_2\right|}{s\sqrt{{}^{1}/_{n_1} + {}^{1}/_{n_2}}}$$

n_1 = total number of subjects in group A

n_2 = total number of subjects in group B

x_1 = difference between pre test Vs post test of group A

$\bar{x}_1$ = mean difference between pre test Vs post test of group A

x_2 = difference between pretest Vs post test of group B

$\bar{x}_2$ = mean difference between pre test Vs post test of group B

s = standard deviation.

DATA PRESENTTION

TABLE - I

S.No	MOTION SENSITIVITY QUOTIENT			
	Group A [EPLEY'S]		Group B [BRANDT-DAROFF]	
	Pre	Post	Pre	post
01	27.0	5.2	27.1	16.4
02	25.1	5.6	25.4	17.1
03	30.1	10.1	30.1	19.5
04	29.2	8.1	29.3	18.1
05	28.0	6.9	25.1	16.2
06	28.8	7.2	30.1	15.2
07	25.1	9.1	27.2	17.1
08	26.4	6.2	31	19.9
09	28.1	6.1	29.1	18.3
10	26.1	10.1	28.3	18.0
11	24.2	7.2	29.8	17.0
12	26.4	6.6	29.4	19.2
13	27.2	5.8	30.0	18.3
14	25.3	8.6	26.4	17.8
15	29.4	10.0	29.9	19.9

Table –II

	DIZZINESS HANDICAP INVENTORY			
S.No	**Group A [EPLEY'S]**		**Group B [BRANDT-DAROFF]**	
	Pre	**Post**	**Pre**	**post**
01	88	42	92	42
02	86	26	80	54
03	76	40	86	46
04	76	26	74	54
05	80	36	78	42
06	74	28	86	46
07	80	32	92	56
08	84	38	84	52
09	86	42	86	48
10	78	38	80	44
11	70	26	90	52
12	84	32	76	40
13	88	40	88	48
14	76	26	90	54
15	78	34	80	56

DATA ANALYSIS AND INTERPRETATION

This chapter deals with the analysis and Interpretation of data's collect from benign paroxysmal positional Vertigo to compare score of motion sensitivity Quotient.

Table -III

Pre Vs Post Test Values of Group A

S.no	Test	Mean	Mean Difference	S.D	Paired T-value
1	Pre-Test	27.07	19.56	2.15	35.33
2	Post Test	7.51			

Between Pre Vs Post test value in response to Epley's Maneuver and Brandt-Daroff Exercises.

Table III shows that the comparative mean value, mean difference, Standard deviation and Paired T-value between pre Vs Post test of Group A.

It explains:

The paired T-value of 35.33 was greater than tabulated T value 2.15, which showed that there was statistically significant difference at 0.05 level between Pre Vs Post test result. The Pre test mean was 27.07, Post test mean was 7.51 and mean difference was 19.56, which showed reduction in score of motion sensitivity quotient in response to Epley's maneuver for three sessions per week.

Graph I : Represents the Mean Value of Motion Sensitivity Quotient between Pre and Post Test for Group A

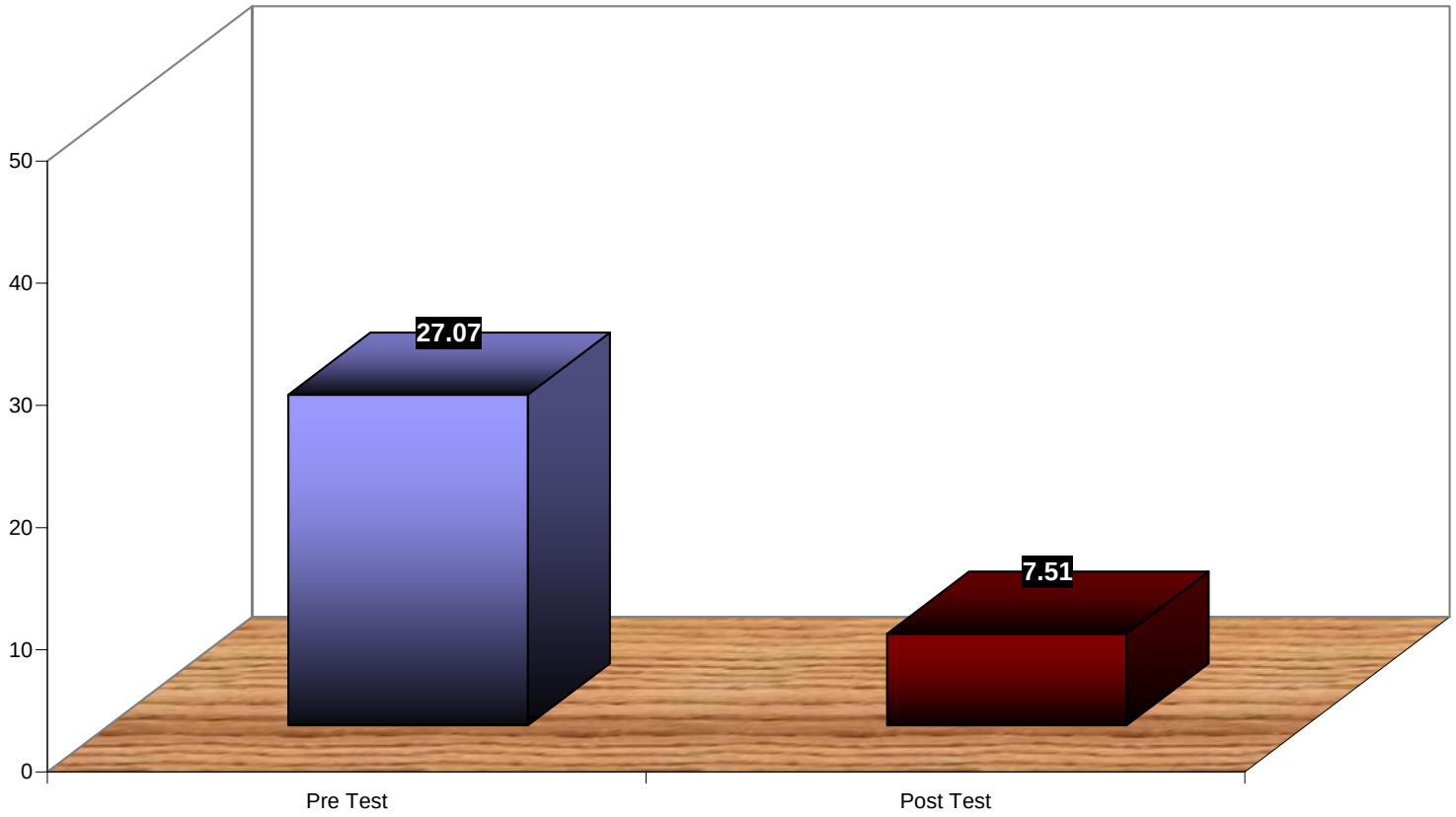


Table -IV

Pre Vs Post Test Values of Group B

S.no	Test	Mean	Mean Difference	S.D	Paired T-value
1	Pre-Test	28.54	10.68	1.9	22.45
2	Post Test	17.86			

Table IV shows that the comparative mean, mean difference, standard deviation and paired t-test between Pre Vs Post test of Group B.

It explains:

The paired t value of 22.45 was greater than tabulated t value of 2.05 , which showed that there was statistically significant difference at 0.05 level between Pre Vs post test results. The pre test mean was 28.54 post test mean was 17.86, mean difference was 10.68 which showed reduction in score of motion sensitivity quotient in response to Brandt-Daroff exercise twice daily for 4 weeks.

Graph II : Represents the Mean value of Motion Senistivity Quotient between Pre and Post test for Group B

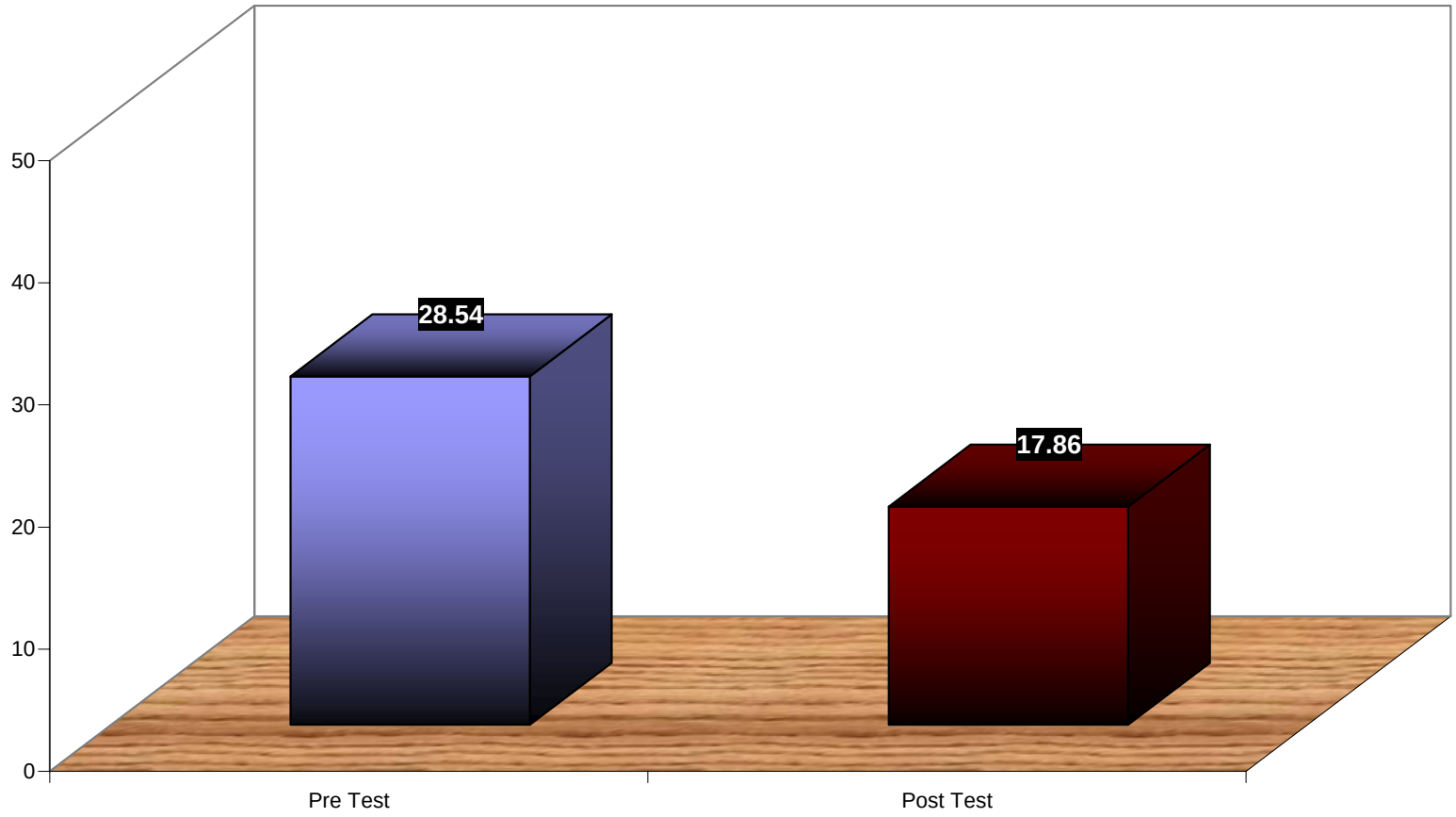


Table –V

S.no	Test	Mean	Mean Difference	S.D	Unpaired t-value
1	Group A	19.56	8.88	1.95	13.01
2	Group B	10.68			

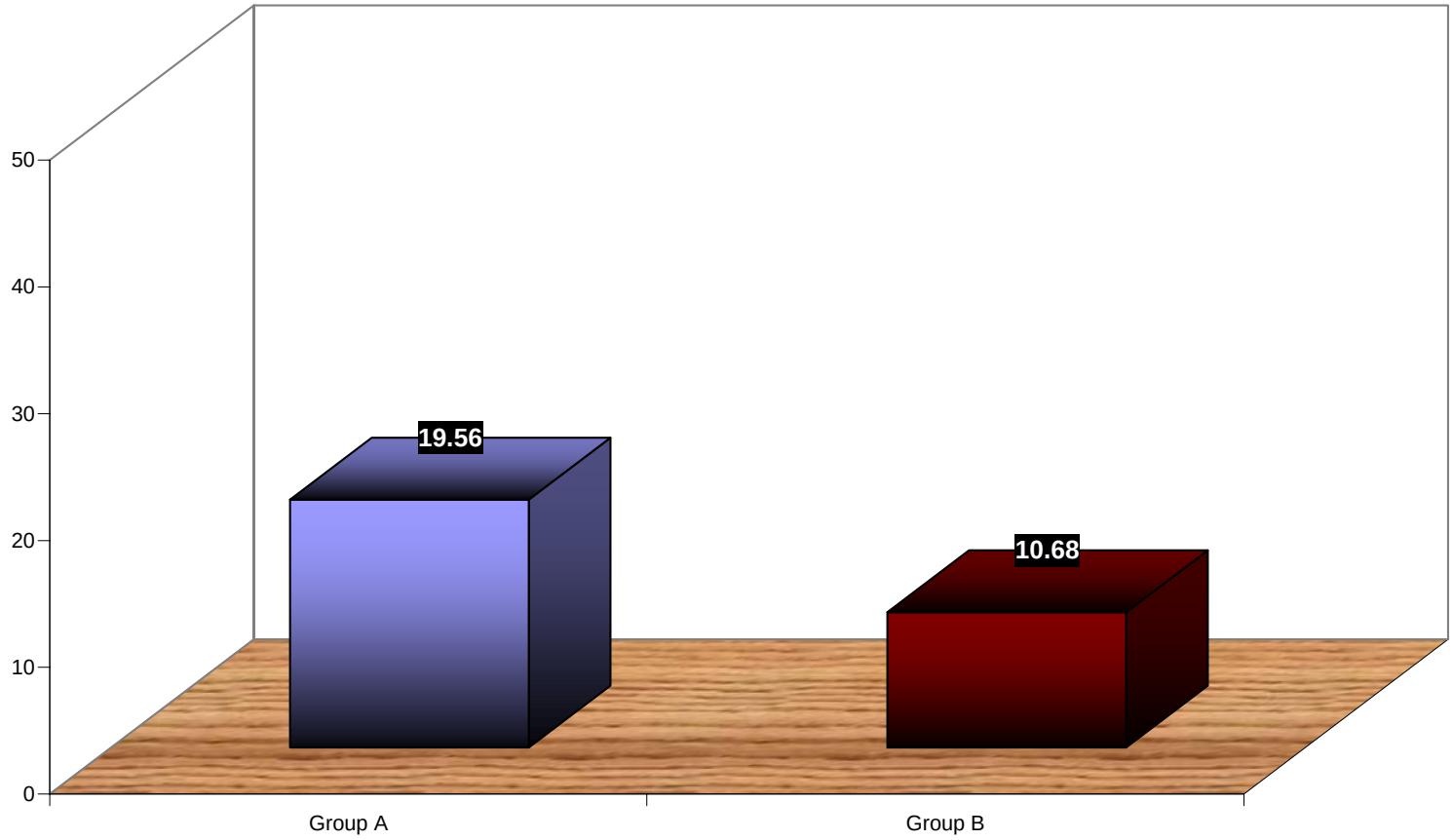
Table V shows the comparative mean, mean difference, standard deviation and unpaired t-value of Group A and Group B.

In explains:

The unpaired t-value 13.01 was greater than the tabulated value 2.05 which showed that there was statistically significant difference at 0.05 level between mean difference of Group A and Group B. the pre Vs Post test mean of group A was 19.56, the pre Vs Post test mean of Group B was 10.68, mean difference of Group A and Group B was 8.88 which showed reduction in motion sensitivity quotient in response to treatment of Group A when compared to Group B.

Therefore the study was rejected the null hypothesis and accepted the alternate hypothesis.

Graph III: Represents the Mean value of Motion Senisitivity Quotient between Group A and Group B



This chapter deals with the analysis and interpretation of data's collected from 30 Benign Paroxysmal Positional Vertigo patients to compare scores of dizziness handicap inventory between Pre Vs Post test values in response to Epley's maneuver and Brandt-Daroff exercise.

Table -VI

Pre Vs Post Test Values of Group A

S.no	Test	Mean	Mean Difference	S.D	Paired T-value
1	Pre-Test	80.2	46.5	5.4	32.0
2	Post Test	33.7			

Table VI shows that the comparative mean value, mean difference, standard deviation and paired t-value between Pre Vs Post test of group A

It explains:

The paired t-value of 32.0 was greater than tabulated t value 2.15, which showed that there was statistically significant difference at 0.05 level between Pre Vs Post test result. The pre test mean was 80.2 and post test mean was 33.7 and mean difference was 46.5, which showed reduction in score of Dizziness handicap inventory in response to Epleys maneuver for three session per week.

Graph IV : Represents the Mean Value of Dizziness Handicap Inventory between Pre and Post Test for Group A

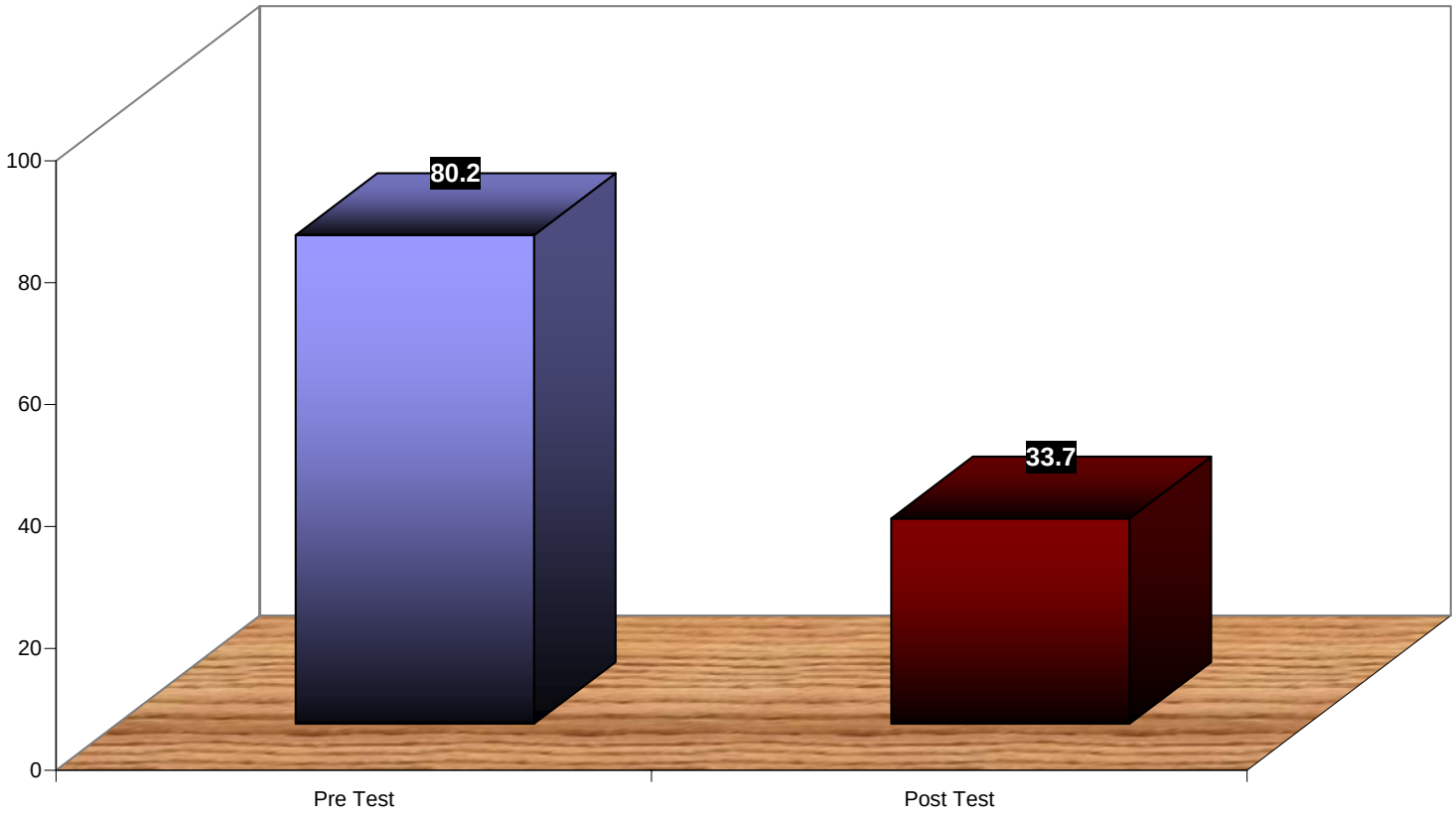


Table -VII

Pre Vs Post Test Values of Group B

S.no	Test	Mean	Mean Difference	S.D	Paired T-value
1	Pre-Test	84.1	34.8	6.6	20.67
2	Post Test	49.3			

Table VII shows that the comparative mean, mean difference, standard deviation and paired t test between Pre Vs post test of Group B.

It explains,

The paired t value of 20.67 was greater than the tabulated t value of 2.15 which showed that there was statistically significant difference at 0.05 level between Pre Vs Post test results. The pre test mean was 84.1, the Post test mean was 49.3 and the mean difference was 34.8 the standard deviation was 6.6, which showed reduction in Dizziness handicap Inventory response to Brandt-Daroff exercise, twice daily for 4 weeks.

Graph V : Represents the Mean Value of Dizziness Handicap Inventory between Pre and Post Test for Group B

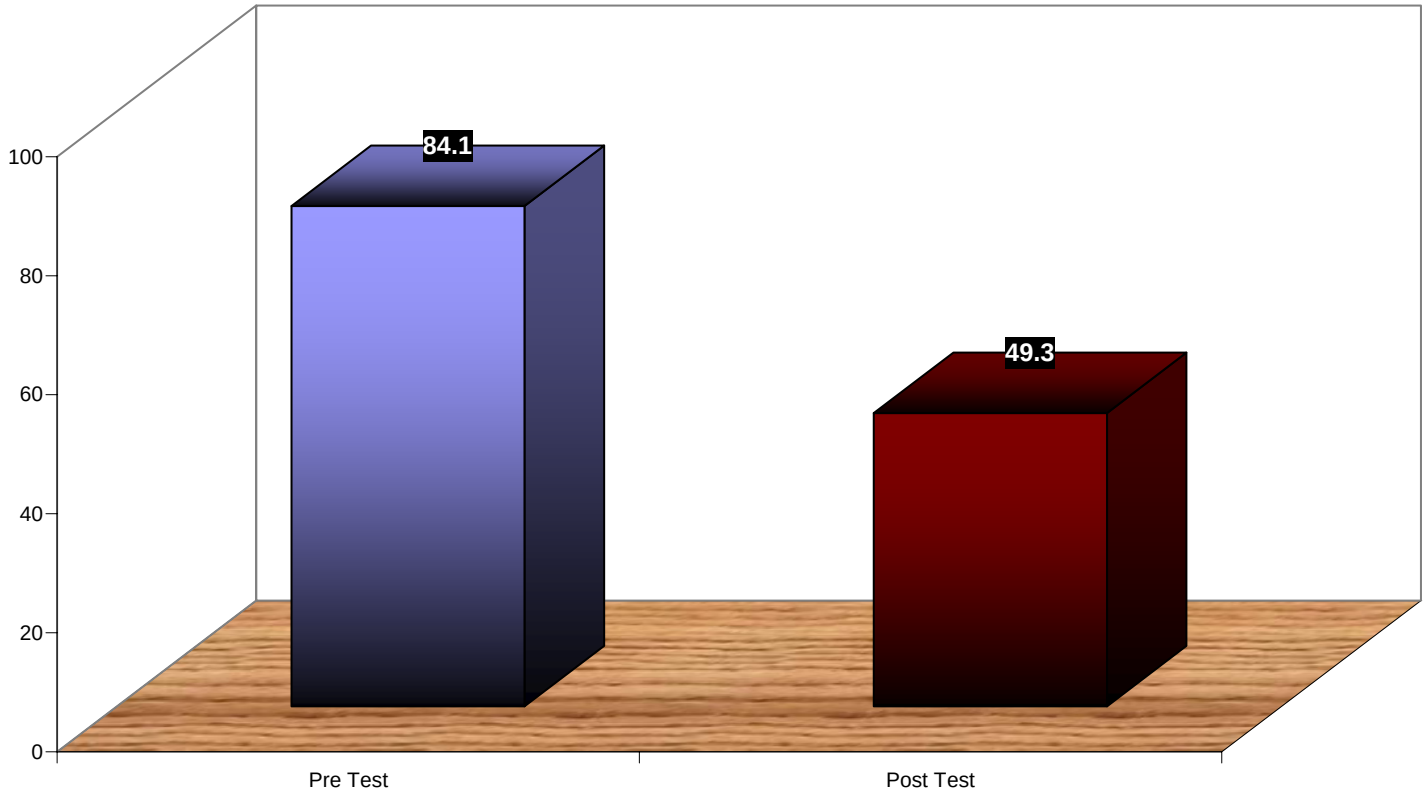


Table –VIII

S.no	Test	Mean	Mean Difference	S.D	Unpaired t-value
1	Group A	46.5	11.7	6.03	5.54
2	Group B	34.8			

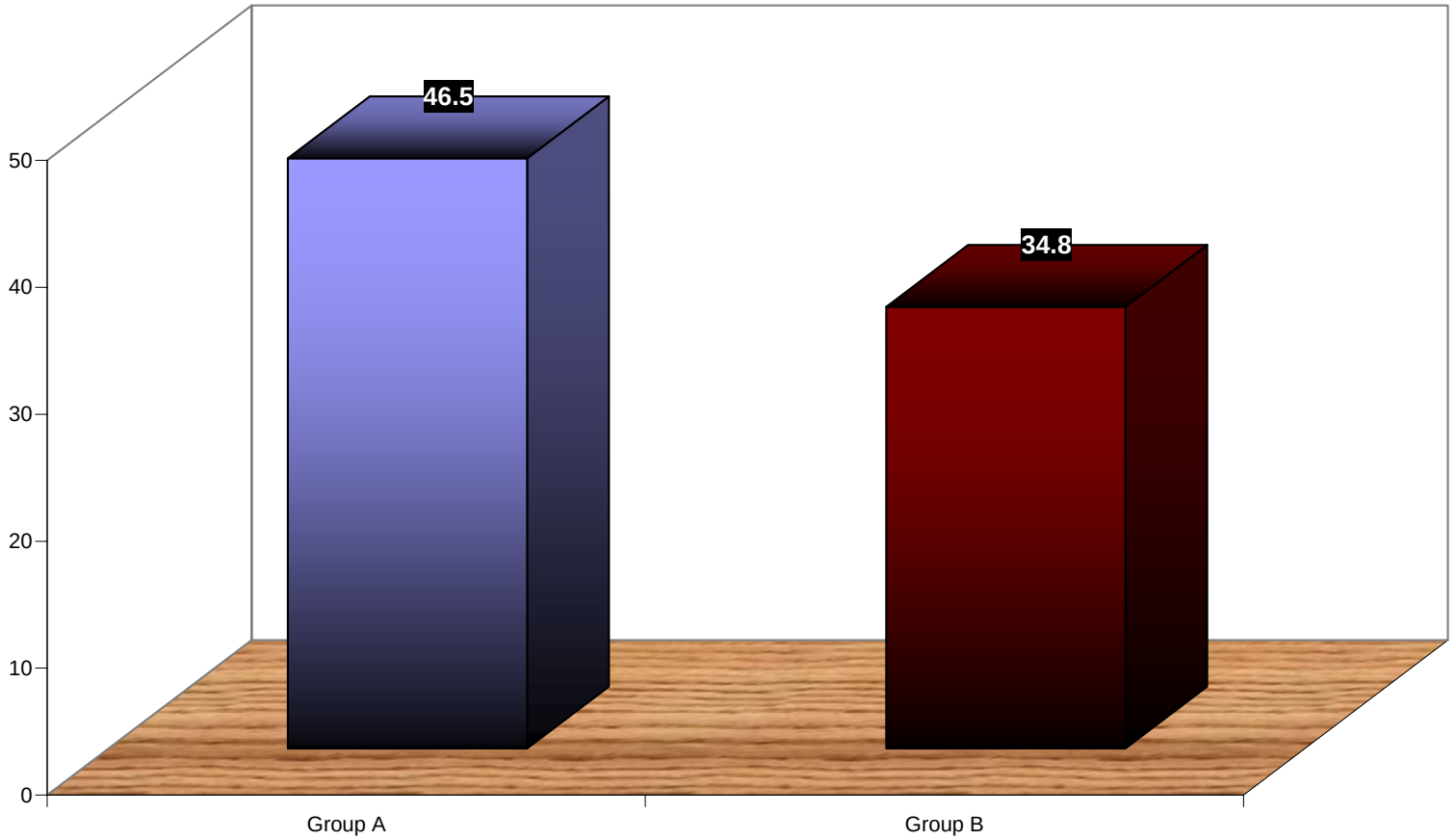
Table VIII shows the comparative mean, mean difference, standard deviation and unpaired t-value of Group A and Group B.

It explains,

The unpaired t-value 5.54 was greater than the tabulated value 2.05 which showed that there was statistically significant difference at 0.05 level between mean difference of Group A and Group B. The Pre Vs Post test mean of group A was 46.5, the pre Vs Post test mean of group B was 3.8 and the mean difference of group A and Group B was 11.7 which showed reduction in Dizziness Handicap Inventory in response to treatment of Group A when compared to Group B.

Therefore the study was rejected the null hypothesis and accepting the alternate hypothesis.

Graph VI: Represents the mean Value of Dizziness Handicap inventory between Group A and Group B



DISCUSSION

The aim of the study was to find out the efficacy of Epley's maneuver and Brandt-Daroff exercise in the management of Benign Paroxysmal Positional Vertigo with Dizziness handicap Inventory and Motion sensitivity Quotient as parameter. Dix-Hallpike test was utilized to identify the patients with Vertigo in this study.

LOPEZ-ESCASES et.al (2001)

Conducted an experimental study an Benign Paroxysmal Positional Vertigo with 39 patients to find out the effectiveness of motion sensitivity Quotient, and Dizziness handicap inventory short forms. The selected patients were treated with Epley's maneuver. The result of the study showed that both subjective assessment tools were effective in measuring the prognosis of positional Vertigo after treatment.

In the analysis and Interpretation of Motion Sensitivity Quotient:- Group A

The paired 't' –test value of 35.33 greater than the tabulated 't' – value 2.15 at 0.05 level of significance showed that there was a statistically significant difference in motion sensitivity quotient between pre and post test.

The pre-test mean was 27.07, post test mean was 7.51, mean difference between pre and post test was 19.56, which showed that there

was a decrement in motion sensitivity quotient that represented the recovery of patients.

In analysis and interpretation of Dizziness handicap inventory: Group A

The paired 't'-test value of 32.0 greater than tabulated 't'-value of 2.15 at 0.05 level of significance, which showed that there was a statistically significant difference in Dizziness Handicap Inventory between Pre and Post test. The pre test mean was 80.2, post test mean was 33.7, mean difference between Pre and Post test was 46.5, which showed that there was decrement in Dizziness Handicap inventory that results in improvement of patients.

BANFIELD G.K. WOOD C, et.al (2000)

Conducted an experimental study can BPPV of 81 patients. Aim of the study was to find out the effectiveness of Epley's maneuver. The selected patients were divided in to two groups namely Group A and Group B. Group A received treatment of Epley's maneuver and Group B received treatment of habituation exercise.

The result of the study showed that the marked improvement in group A than Group B.

ALEV VNERT et.al., Feb(2003)

Conducted an experimented study on 417 patients with benign paroxysmal positional Vertigo. The selected patients were assessed by

Dix-Hallpike test and treated with Epley's maneuver. The result of study showed that there was reduced episodes of full following epley's maneuver.

Based on usage (of Alev Uneri et.al) Dix-Hallpike test in above study, the present study had been done with help of Dix-Hallpike test for selecting subjects of Benign Paroxysmal Positional Vertigo, and the above study also recommends the Epley's maneuver as effective treatment tool for Benign Paroxysmal Positional Vertigo and Supports the present study.

REASON FOR THE IMPROVEMENT BY EPLEY'S MANEUVER

The maneuver intended to move debris (or) earlock (otoconia) which displaced from otolithic membrane back into the utricle by utilizing gravity and sequence of head movement.

It results in removal of debris out of posterior canal and into the common crus. It causes the matching of sensory information.

In the analysis and interpretation of Motion Sensitivity Quotient in Group B.

The paired t-test 22.45 greater than tabulated value (P>2.15) at 0.05 level of significance, which showed that there was a statistically significant difference in Motion Sensitivity Quotient between pre and post test. The pre test mean was 28.54, Post test mean was 17.86, mean difference between Pre Vs post test was 10.68 which showed that there

was a decrement in Motion Sensitivity Quotient that results in Improvement of patients.

In the analysis and interpretation of Dizziness Handicap inventory in Group B.

The paired t-test 20.67 greater than tabulated value (P.2.15) at 0.05 level of significance, which showed that there was a statistically significant difference in Dizziness handicap inventory between pre and post test.

The pre test mean was 84.1, post –test mean was 49.3, mean difference between Pre Vs Post test was 34.8 which showed that there was a decrement in Dizziness handicap inventory that result in improvement of patients.

NORRE E. et.al (1988)

Conducted an experimental study on Benign paroxysmal positional vertigo with 60 patients, to find out efficacy of Brandt Daroff habituation training in older and younger patients. The result of study showed that cure rate in older patients was slower than younger patients.

The study of Norre.E.et.al (1988), recommended to take Brandt Daroff exercise as a tool for treatment and supported the present study in which Brandt-Daroff exercise shows improvement in benign Paroxysmal Positional Vertigo.

REASONS FOR IMPROVEMENT BY BRANDT DAROFF EXERCISE:

Brandt – Daroff exercise evokes the symptom by the repetition of position which fatigue the response and stimulate the CNS for compensation by habituation and adaptation.

Compensation occur at the level of vestibular nuclei and cerebellum (integration level) by rebalancing tonic activity at vestibular nuclei as well as modulation by cerebral cortex.

In the analysis and interpretation of motion sensitivity Quotient of Group A and Group B

The unpaired t-value 13.01 was greater than tabulated 't' value (P>2.05) at 0.05 level of significance which showed that there was statistically significant difference between Pre Vs post results of Group A and Group B. the mean value of Group A was 19.56, the Group B was 10.68 and mean difference was 8.88 which showed that there was significant reduction in Motion Sensitivity Quotient and improvement in condition of patients in Group A when compared to Group B in response of treatment.

In the analysis and interpretation of Dizziness handicap Inventory of Group A and Group B.

The unpaired t value 5.54 was greater than tabulated 't' value (P>2.05) at 0.05 level of significance which showed that there was statistically significant difference between Pre Vs post results of Group A

and Group B. the mean value of group A was 46.5, the group B was 34.8 and mean difference was 11.7, which showed that there was significant reduction in Dizziness handicap Inventory and Improvement in condition of patients in Group A when compared to Group B in response of treatment.

SOTO VARALA. A. et.al. (2001)

Conducted an experimental study on Benign Paroxysmal positional Vertigo with 106 patients. To evaluate the efficacy of 3 physical treatment the brandt-daroff habituation exercises, semont maneuver and Eplays maneuver. The selected patients were divided in to 3 groups 1st group received Brandt-Daroff exercise, 2nd group received Semonts maneuver, 3rd group received Epley's maneuver. This result of study showed that the cure rate obtained with brandt-Daroff maneuver 62% and Semonts maneuver was 90% and Epley's maneuver was 93%.

The result of the study was similar to present study in which Epley's maneuver - Group A has greater improvement than Brandt-Daroff exercise – Group B. Therefore the study was rejected the null hypothesis and accepted alternate hypothesis.

REASON FOR MORE IMPROVEMENT IN EPLEYS MANEUVER THAN BRANDT-DAROFF EXERCISE.

The brandt-Daroff exercise only causes habituation and adaptation of CNS which had longer duration for resolution of symptoms without altering the cause of symptom (otoconia).

But Eley's maneuver remove the cause of symptom (otoconia) and provides matching of Sensory Information from both side.

Hence it got more improvement than Brandt-Daroff Exercise.

SUMMARY AND CONCLUSION.

The objective of the study was to document the effectiveness of Epley's maneuver and Brandt-Daroff exercise on Benign Paroxysmal Positional Vertigo with Motion Sensitivity Inventory and Dizziness handicap Inventory as a Parameter.

To conduct the study, the total number of 30 Benign Paroxysmal positional Vertigo patients with unilateral involvement, at the age group of 45 – 60 years, who are suitable for inclusion criteria, were selected by purposive sampling technique and they were divided in to groups namely Group A and Group B. The Group A subjects underwent an exercise programme of Epley's maneuver and the Group B underwent Brandt-Daroff Exercise program, informed consents were obtained from subjects individually.

The pre-test of motion Sensitivity quotient and Dizziness Handicap inventory were conducted and recorded before and after treatment programme.

The post-test were conducted after 4-weeks of the treatment programme of Epley's maneuver in Benign Paroxysmal Positional Vertigo patients. The result were recorded by Motion Sensitivity Quotient and Dizziness handicap Inventory.

The paired t-test was used to compare the pre Vs post test values of motion sensitivity Quotient and Dizziness handicap Inventory in Group A and Group B separately. The unpaired t-test was used to compare the

mean difference of Pre Vs Post test values of Motion Sensitivity and Dizziness Handicap inventory between Group A and Group B.

In analysis and Interpretation in Group A the paired t-test of Motion Sensitivity Quotient between Pre Vs post test value 2.15 at 0.05 level of significance. The result showed that there was statistically decrease in motion sensitivity Quotient between Pre and Post test.

The paired t-test of Dizziness handicap inventory between Pre Vs Post test value was 32.0 greater than tabulated value 2.15 at 0.05 level of significance. The result showed that there was statistically marked significant decrease in Dizziness Handicap Inventory between Pre and Post test.

In group B, the paired t test of Motion Sensitivity Quotient between Pre Vs Post test values was 22.45 greater than the tabulated 't' value (2.15) at 0.05 level of significance . The result showed that there was a statistically decrease of score in Motion Sensitivity Quotient between Pre and Post test.

The paired t test of Dizziness handicap Inventory between Pre Vs Post test value was 20.67 greater than the tabulated value (>2.15) at 0.05 level of significance. The result showed that there was a statistically decrease of score in Dizziness Handicap Inventory between Pre and Post test.

The mean value of Group a was 19.56 and Group B was 10.68 and mean difference was 8.88 which showed that there was significant

reduction in Motion Sensitivity Quotient in Group A when compared to Group B is response to treatment.

The mean value of Group a was 46.5 and Group B was 34.8 and mean difference was 11.7 which showed that there was significant reduction in Dizziness handicap Inventory in Group A when compared to Group B in response to treatment.

The unpaired t test value 13.01 was greater than the tabulated 't' value 9P>2.05) at 0.05 level which showed that there was statistically significant difference between Pre Vs post results of Group A and Group B. the mean value of Group A was 19.56 the Group B was 10.68 and mean difference was 8.88 which showed that there was significant reduction in Motion Sensitivity Quotient in Group A when compared to group B in response to treatment.

The unpaired t test value 5.54 was greater than the tabulated 't' value (P>2.05) at 0.05 level which showed that there was statistically significant difference between Pre Vs post results of Group A and Group B. the mean value of Group A was 46.5 the group B was 34.8 and mean difference was 11.7 which showed that there was significant reduction in Dizziness Handicap Inventory in Group A when compared to Group B in response to treatment.

In statistical analysis, the result of this study showed that there was significant improvement in both Group A and Group B. the result also showed that there was statistical improvement in Group A when compared to Group B subjects of Benign Paroxysmal Positional Vertigo.

CONCLUSION

The study concluded that there was a statistical significant decrease in score of Dizziness Handicap Inventory and Motion Sensitivity Quotient in Benign Paroxysmal Positional Vertigo after Epley's maneuver than Brandt-Daroff Exercise.

The result of the study concluded that the Epley's Maneuver was effective treatment for benign – paroxysmal Positional Vertigo than Brandt-Daroff Exercise.

RECOMMENDATION.

The similar study can be conducted with Epley's maneuver and Semonts Maneuver to document their efficacy in Benign Paroxysmal Postional vertigo.

The similar study can be conducted to find out the efficacy of Semonts maneuver and Brandt-Daroff exercise in other condition like multiple sclerosis, Parkinson disease.

The similar study can be conducted by using visual analog scale for Dizziness as a parameter in finding the efficacy of Epley's maneuver in Management of Benign paroxysmal Vertigo.

This similar study can be conducted with Epley's and habitation exercise to document their efficacy in benign paroxysmal positional Vertigo.

BIBILOGRAPHY

1. **Arthus . C. Guyton** "Medical Physiology", Harcourt Asia Publishers. International Company, Mississippi, 10th Ed. 2000.
2. **Darry Ann Umpherd**, "neurological Rehabitation", Mosby publication, California , 3rd Ed, 1995.
3. **Delsia & Brace M.Guns**, "Rehabilitation Medicine – Principle and Practice' Lippincott – Raven Publishers, Philadelphia, 3rd Ed. 1998.
4. **Braunwald & Fauci**, "Harrison's Principle of internal Medicine", Mcgraw, Hill publication, Boston, 15th Ed. 2003.
5. **Kothari. C.R,** "Research Methology Methods and Techniques", klshwa Prakashan, new Delhi, 2nd Ed. 1990.
6. **Mahajan B.K**. "Methods in Bio-Statistics", Jaypee Brothers, New Delhi, 5th Ed. 1991.
7. **O' Sullivan susan. B**. 'Physical Rehabilitation Assessment and Treatment" F.a.Davis , Philadelphia, 3rd Ed. 1994.
8. **Joel A. Delsia**, " Rehabilitation medicine, Principle Assessment and Practice", Lippincot Williams and Wikins Publication, New jersey, 3rd Ed. 1998.
9. **Siddharth N. Shah**. "API Text Book of Medicine", the Association of Physician of India, Mumbai, 7th Ed. 2003.
10. **Susan J. Hardman, P.T.,** "Vestibular Rehabilitation", F.A. Davis Company, Philadelphia, 3rd ed. 2000.
11. **Richard S. Snell**, "Clinical Neuroanatomy for medical students", Philadelphia, 4th Ed. 1997.
12. **Sir John Walton**, "Disease of nervous System", ELBS, oxford, 9th Ed. 1985.

REFERENCES.

01. **Lopez-Escamez. J.A. et.al.**, Evaluation of treatment of Benign paroxymal Positional Vertigo With DHT – s questionnaires and Motion Sensitivity Quotient. "**Acta Otorrinolacingo ES**P", Nov-Dec 2001. Vol 53(8), Pp: 660-666.

2. **Soto Varela. A., et.al** Benign Paroxysmal Vertigo, A comparative prospective study of the efficacy of EPley's maneuver, " **Rev laryngot otol Rhinol** ", 2001, Vol 122 (3), Pp: 179-183.

3. **Atacan, Erbil MD**. Benign paroxysmal Positional vertigo following stapeclectomy of the Epley's maneuver, "**laryngoswap**", July 2001, Vol III (7) Pp: 1257 – 1259.

4. **Aranda – Moreno et.al**, Epley and Semonth maneuvers in the treatment of benign Paroxysmal Positional vertigo, 'Spanish" Vol. 136(5) Sep'2000.

5. **Banfield. G.K**. Does Vestibular habituation Still have a place in the treatment of Benign paroxysmal positional vertigo, "**Journal of Laryngology & Otology**" Vol. 114 (7) 2000. Pp: 501-505.

6. **Beckers A. et. al**., Comparative study of two types of exercises treatment for paroxysmal positioning vertigo, '**Archives of otorhinolaryngology**", Vol. 42, 1988, Pp: 287-289.

7. **Haynes. D.S. et.al**., Treatment of benign positional vertigo using the semont maneuver, efficacy in patients presenting without nystagmus",

unline Journals of Lippincott Williams Wilkins," Vol 132 95) 2002, Pp: 796-801.

8. **Douglas E. MD. et. al**., Success of modified Epley maneuver in Treating benign Paroxysmal Positional Vertigo. "**lacyngoscope**", June 1999, Vol.109 (6). Pp. 900-903.

9. **Richard W. et.al**. Efficacy of Epley maneuver for posterior cancel Benign paroxysmal positional Vertigo a long term, "**Controlled study of 81 patients Ear, Nose, Throat Journal**", Jan 2005, V ol 77 (8) .

10. **Hilton M. et.al**, " **The efficacy of the Epley maneuver in benign paroxysmal Vertigo** "Journal of Otolaryngol" Dec 2002, Pp: 440-5

11. **Xing G. Bu X. et.al**., '**Particle Repositioning maneuver for benign paroxysmal positional vertigo of posterior semicircle cancel**," Zbonghalla Er. Bi yan Hou ke za Zhi' [Article in Chinese], Jan 1999, Vol 34 (3). Pp:163-5.

12. **Yimbac K**., A randomized trial of the canalith respositioning procedure , '**Journal of laryngoscope**", May 2003, Vol 113 (5) Pp: 828-32

APPENDIX

DEFINITION OF TERMS

BENIGN PAROXYSMAL POSITIONAL VERTIGO [BPPV]

The Benign Paroxysmal Positional vertigo is most common cause of peripheral vestibular disorder it is characterized by brief period of Vertigo that occurs when subject head moved into specific position usually with affected ear down.

HALLPIKE – DIX POSITION:

Patient is taken rapidly from the sitting to supine lying with head hanging position.

Note: head is turned 45° to the side of the examiner for each test.

EPLEY'S MANEUVER;

Epley has proposed this approach, it is also called the particle repositioning, canalith repositioning procedure and modified liberatory maneuver.

It involves sequential movement of the head in to different positions, staying in each position for roughly 30 seconds.

PARAMETER

- ☞ Dizziness handicap Inventory
- ☞ Motion Sensitivity Quotient.

SELECTION TECHNIQUE:-

DIX HALLPIKE TEST;-

Step A:-

- Patient is long sitting position on the couch.
- Therapist stands on the patient's affected side and rotate the patients head 45° to the affected side in order to align the posterior semicircular canal with the sagital plane of the body. The patient eyes should remain open.

Step B:

Move the patient from the seated to the supine position with the affected ear downward quickly and extend the patients neck until the chin is pointing slightly upward. Examiner monitors for symptoms of vertigo and its duration and latency of vertigo and observe the eye for nystagmus.

EPLEYS MANEUVER:

- The patient is taken rapidly into the hall pike Dix position that provokes the symptoms and is kept in that position for 3 to 4 minutes.
- The head is then slowly taken through extension (lowering the head even more) and is turned into the opposite Hall pike – Dix position.
- Epley's recommends that the patient to be rolled over on to his or her sides so that the head is turned toward the floor.
- The patient remains in this position for another 3 to 4 minutes.
- The he or she slowly sits up.





INSTRUCTION FOR PATIENTS HAVING THE EPLEYS MANUVER:

Before the Epley's Maneuver:

- → Eat a light meal 4 hours before the procedure.
- → Wear causal, comfortable clothing.
- → Therapist should have meditation hand to help control the symptoms.

After the Epley's Manuver:

- → The patient must then remain in an upright position for 48 hours.
- → Use 2 or 3 pillows to elevate head when sleeping or resting.
- → Avoiding bending forward, looking up or down with the head and absolutely not trying down.
- → For 5 more days, the patient is advised not to lie– on the affected side.

PARAMETERS

MOTION SENSITIVY QUOTIENT

It is a standardized list of vertiginous position test.

S.No	Baseline Symptoms	Intensity	Duration	Score
01	Sitting – Supine			
02	Supine – left side			
03	Supine – right side			
04	Supine – Sitting			
05	Left hallpike			
06	-- Sitting			
07	Right hallpike			
08	-- Sitting			
09	Sitting – nose to left knee			
10	Sitting – erect left			
11	Sitting – nose to right knee			
12	Sitting – erect right			
13	Sitting – head rotation x 5			
14	Sitting – head flexion & extension x 5			
15	Standing – turn to right			
16	Standing – turn to left			
			TOTAL	

Intensity

Scale from 0 to 5

0 - No

5 - Severe

Duration

score	Duration
0	0-4sec
1	5 – 10 sec.
2	11 – 30 Sec.
3	≥30 Sec.

$$\text{Motion Sensitivity Quotient} = \frac{\text{Position x Score x 100}}{2048}$$

Intensity of dizziness will be stated by the patient and duration of dizziness will be measured with a stop watch.

DIZZINESS HANDICAP INVENTORY

The dizziness handicap inventory is a set of questionnaire containing 25 questions which are sub grouped into functional (F), emotional (E) and physical (P) components to which patients respond.

		Yes	No	Sometimes
P1	Does looking up increase your problem?			
E2	Because of your problem, do you feel frustrated?			
F3	Because of your problem, do you restrict your travel for business or recreation?			
P4	Does walking down the aisle of a supermarket increase your problem?			
F5	Because of your problem, do you have difficulty getting in to or out of bed?			
F6	Does your problem significantly restrict your participation in social activities such as going out to dinner, the movies, dancing, or to parties?			
F7	Because of your problem, do you have difficulty reading?			
P8	Does performing more ambitious activities like sports or dancing or household chores such as sweeping or putting dishes away increase your problem?			
E9	Because of your problem, are you afraid to leave your home without having someone accompany you?			

E10	Because of your problem, are you embarrassed in front of others?			
P11	Do quick movements of your head increase your problem?			
F12	Because of your problem, do you avoid heights?			
P13	Does turning over in bed increase your problem?			
F14	Because of your problem, is it difficult for you to do strenuous housework or yard work?			
E15	Because of your problem, are you afraid people may think you are intoxicated?			
F16	Because of your problem, is it difficult for you to walk by yourself?			
P17	Does walking down a sidewalk increase your problem?			
E18	Because of your problem, is it difficult for you to concentrate?			
F19	Because of your problem is it difficult for you to walk around your house in the dark?			
E20	Because of your problem, are you afraid to stay home alone?			
E21	Because of your problem, do you feel handicapped?			

E22	Has your problem placed stress on your relationships with members of your family or friends?			
E23	Because of your problem, are you depressed?			
F24	Does your problem interfere with your job or household responsibilities?			
P25	Does bending over increase your problem?			
	total	(X4)	(X0)	(X2)

Total: _____ F _____ E _____ P _____

(38) (36) (28)

INFORMED CONSENT TO PARTICIPATE VOLUNTARILY IN A RESEARCH INVESTIGATION.

DEPARTMENT OF PHYSICAL THERAPY,
JKK MUNIRAJAH MEDICAL RESEARCH FOUNCATION,
KOMARAPALAYAM – 638183, TAMILNADU.

Name :
Age :
Sex :
Occupation :
Address :

Declaration:-

I have fully understood the nature and purpose of the study. I accept to be a subject in this study , I declare that the above information is true to my knowledge.

Signature of the subject

Date:
Place:

ASSESSMENT CHART

Name :-

Age :-

Sex :-

Side of disorder :-

Dix-Hallpike test :-

Mode of treatment : Epley's Manueuver, Brandt-Daroff Exercises

Measurement :

Parameter	**Before Treatment**	**After Treatment**
Motion Sensitivity Quotient Dizziness Handicap Inventory		